

WHAT IS CLAIMED IS:

1 1. Controller circuitry that detects polarity reversals in a read/write head of a
2 disk drive system, the controller circuitry comprising:

3 decoding circuitry for decoding a direction signal to provide a decoded signal,
4 wherein the direction signal is generated by the read/write head in response to reading a
5 directional pattern stored on a data track of a magnetic disk; and

6 comparing circuitry for determining if the decoded signal matches a first pattern
7 that indicates whether the read/write head have reversed polarity.

1 2. The controller circuitry of claim 1 wherein the comparing circuitry
2 includes a plurality of AND gates that compare the first pattern to the decoded signal.

1 3. The controller circuitry of claim 2 wherein:
2 a tolerance between the first pattern and the second pattern is 8 bits.

1 4. The controller circuitry of claim 1 wherein the decoding circuitry includes
2 an amplifier that amplifies differential read signals from the read/write head to generate an
3 amplified read signal, a buffer that converts the amplified read signal into differential digital
4 signals, and an exclusive OR gate that is coupled to receive the differential digital signals.

1 5. The controller circuitry of claim 4 wherein the exclusive OR gate
2 performs an exclusive OR function on a first one of the differential digital signals generated in a
3 current clock cycle and a second one of the differential digital signals generated in a previous
4 clock cycle.

1 6. The controller circuitry of claim 1 wherein the direction patterns are
2 written in regions of the data track that precede each servo sample.

1 7. The controller circuitry of claim 1 wherein the first pattern is 11011.

1 8. A disk drive system for reading magnetic recording media, the disk drive
2 system comprising:

3 a read/write head that includes a read sensor for reading data written onto data
4 tracks on the magnetic recording media and generating a read signal, wherein the read sensor
5 reads direction patterns stored in regions of the data tracks; and

6 decoder circuitry for decoding the read signal to generate a decoded read signal
7 and comparing the decoded read signal to a pattern to determine if the read/write head has
8 reversed polarity,

9 wherein the disk drive system reverses a polarity of the read signal if a portion of
10 the decoded read signal matches the pattern, and the portion of the decoded read signal is
11 generated in response to reading one of the direction patterns.

1 9. The disk drive system as defined in claim 8 wherein the decoder circuitry
2 includes a plurality of AND gates that compare the decoded read signal to the pattern to
3 determine whether the read/write head has reversed polarity.

1 10. The disk drive system as defined in claim 9 wherein the decoder circuitry
2 includes a shift register coupled to inputs of the AND gates.

1 11. The disk drive system as defined in claim 8 wherein the decoding circuitry
2 includes:
3 an amplifier for amplifying the read signal to generate an amplified signal;
4 a buffer for generating differential digital bits in response to the amplified signal;
5 two sets of shift registers for storing the differential digital bits; and
6 an exclusive OR gate coupled to two of the shift registers.

1 12. The disk drive system as defined in claim 11 wherein the exclusive OR
2 gate performs an exclusive OR function on a first differential digital bit generated at a positive
3 output of the buffer in a current clock cycle, and a second differential digital bit generated at a
4 negative output of the buffer in a previous clock cycle.

1 13. The disk drive system as defined in claim 8 wherein the direction patterns
2 are stored on the magnetic recording media before servo samples.

1 14. The disk drive system as defined in claim 8 wherein the pattern is 11011.

1 15. A disk drive system for reading magnetic recording media, the disk drive
2 system comprising:

3 means for writing direction patterns on data tracks of a magnetic disk and reading
4 the direction patterns to generate a polarity signal;

5 means for determining if the polarity signal matches a first pattern; and

6 means for reversing the polarity of signals generated by reading data on the data
7 tracks if the polarity signal matches the first pattern.

1 16. The disk drive system as defined in claim 15 wherein the means for
2 determining compares the polarity signal to a second pattern that indicates the means for writing
3 and reading has not reversed polarity.

1 17. The disk drive system as defined in claim 16 wherein a tolerance between
2 the first pattern and the second pattern is 8 bits.

1 18. The disk drive system as defined in claim 15 wherein the means for
2 determining comprises:

3 means for generating differential digital bits in response to the polarity signal; and
4 means for performing an exclusive OR function on the differential digital bits.

1 19. The disk drive system as defined in claim 18 wherein the means for
2 performing the exclusive OR functions performs the exclusive OR function on a first differential
3 digital bit generated in a current clock cycle and a second differential digital bit generated in a
4 previous clock cycle.

1 20. The disk drive system as defined in claim 15 wherein the first pattern is
2 11011.